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Remarks

The Office Action, dated October 7, 2002, has been carefully considered. The claims have been amended to more clearly set forth the Applicants' contributions to the art and do not introduce new matter into the disclosure of the invention. The basis for the amendments to the claims can be found on pages 6, 7, 14, 15, 19 and 21 of the Specification. It is believed that no additional fee is required as the number of independent and dependent claims is the same as originally filed.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner has objected to claim 61 for an informality as containing no period at the end of the claim. Claim 61 has now been amended to provide for a period at the end of the sentence, as has claim 6.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 1-71 under 35 U.S.C. § 112, first paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the Examiner has pointed out that claim 1 is indefinite for improper language for a Markush format. Claim 1 has now been amended to provide for proper Markush language. Antecedent basis for this change is found on page 6, paragraph 0021.

The Examiner has pointed out that claim 4, line 1, recites a "nickel alloy" wherein none of the components listed are nickel alloys. Claim 4 has now been amended to provide for a selection of base metals. Antecedent basis for this change is found on page 7, paragraph 0026.

The Examiner has objected to the phrase "such as" in claim 6, which renders the claimed indefinite. Claim 6 has now been amended to provide for proper Markush language.

The Examiner has objected to claim 29 as being indefinite for lack of units of boric acid. Claim 29 has now been amended to provide for the proper units of boric acid as moles per liter. Likewise, paragraph 0052, on page 15 has been amended to units consistent with

this change. Antecedent basis for these changes is found on page 6, paragraph 21 and page 14, paragraph 0048.

The Examiner has objected to claim 34 for the use of the phrase "such as," which renders the claimed indefinite. Claim 34 has now been amended to remove this phrase.

The Examiner has objected to claim 53 for reciting a "second coating" when it is unclear how the second coat limits the claim. Claims 53 and 54 have now been amended to provide for one or more additional metal ions retained by the zeolite particles. Antecedent basis for this change is found on pages 19 and 21.

Rejection Under 35 U.S.C. 103

The Examiner has rejected claims 1-3, 7-20, 34-36, 38-39, 43-52, 56-60 and 69-71 are rejected under 35 USC § 103(a) as being unpatentable over Beck 5,634,986 (Beck) in view of Japanese Patent JP 03-188168A (JP '168). The Examiner contends that Beck teaches a method of coating metal including a continuous process for treating sheets such as by preparing a substrate for polymer coating including a prewash, an acid or alkaline cleaning, an acid rinse, conversion coating, and water rinse, wherein a polymer coating is then coated onto the surface and dried. The Examiner then goes on to state that JP '168 teaches a method for treating an aluminum substrate with a solid resin composition that includes an antibacterial zeolite.

However, the Beck reference ***does not***, as the Examiner contends, teach "that the claimed polymer and polymer coating additives that are coated on the surface may include an antimicrobial or biocidal agent." While the Examiner concedes that Beck "does not explicitly teach the antibiotic powder instantly claimed," it must be emphasized that Beck does not teach the use of ***any*** antibiotic agents in the polymer coatings. Beck merely teaches the use of a pretreatment process prior to coating and the Applicants are not claiming any of these pretreatment steps as novel by themselves. It should be noted that Beck's use of antimicrobial agents is not related to the polymer coating put onto the metal surface but to the solution baths used in precoating. Beck's use of antimicrobial agents does not provide any antimicrobial properties on the coated strip itself but is directed to inhibiting their growth in the wash or rinse mixtures. Beck explicitly states (column 11, lines 39-44) that "the polyethylene can be initially mixed with water to form a concentrate as discussed above.

These concentrates can also include one or more additional chemicals (*e.g.*, acid cleaners, alkaline cleaners, surfactants, conditioners, conversion coating chemicals, antifoam agents, antimicrobial or biocidal agents, etc.) that are used during one or more of the wash or rinse stages." The concentrate is then diluted with water to form the desired wash or rinse composition.

Furthermore, Beck makes it clear that the antimicrobial features are for stages 2-6 and not for the final product. Beck continues (column 17, lines 38-44) that "[s]imilarly, an antimicrobial or biocidal agent of the type discussed above can be added to the aqueous compositions used in any of Stages 2-6 to inhibit the growth of microorganisms. In one embodiment, the antifoaming agent and/or the antimicrobial or biocidal agent is combined with the inventive mobility enhancer in any of Stages 2-6, and preferably in Stage 2 or Stage 4." Beck basically uses antimicrobial agents to keep microbes from growing in the bath -- a standard procedure well known in the art. Beck in no way suggests that an antimicrobial agent may be used as a coating feature to prevent microbial growth on the surface of the coated metal. This is further evident from the fact that the additives are rinsed off prior to the coating. In the methods of the present application, the antimicrobial coating is not applied until after the rinsing operation.

The JP 03-188168 reference teaches that a coating may be used on formed metal cans to provide antibacterial properties with a resin composition in which antibacterial zeolite is dispersed. The JP' 168 reference relates to can production and not roll coating a metal strip with an antimicrobial polymer coating. The combination of JP '168 with Beck simply does not provide the teachings of the present invention. While both the JP '168 and Beck references are directed to producing metal cans, neither reference is directed to antimicrobial polymer coatings on strips of sheet metal using a roll coating process as is required by the present claimed invention. Likewise, neither reference teaches that the coating must be hardened and adhered to the sheet surface.

Therefore, in order to go from the JP '168 materials to those claimed in the method claims of the present application (*e.g.*, claim 1) you must make at least two modifications, which fall outside of the present application. There is no suggestion at all to make those modifications, or that if those modifications were made that the material formed would retain the antimicrobial ability described in JP '168. In that regard, it is interesting to note the

materials produced a by the procedures of Beck would suggest that a siccative coating, which absorbs moisture, should be used. In the methods of the present invention, one would not want the coatings to absorb moisture and then such a method would produce a material, which clearly falls outside the claims of the present application. Beck, therefore, would suggest that if you try to make the modifications to bring his compounds closer to those claimed in the present application, the polymer must be modified so as to be used after the wash and rinse steps and to form an adhered coating as required in the present application. Accordingly, there is no suggestion at all in Beck or JP '168 to make the modifications that would be required to change the JP '168 materials to those claimed in the present application. Since a proper obviousness rejection requires a suggestion or motivation to make the required modifications, and none exist in the JP '168 reference, the materials claimed in the present application would not have been obvious over those disclosed in JP '168 and it is therefore respectfully requested that the rejection under 35 U.S.C. § 103(a) be withdrawn.

One skilled in the art would find nothing in Beck or JP '168, either alone or in combination, that would teach or suggest the present invention or a motivation for making the present invention. Furthermore, there is no motivation to combine these references in such a way as to arrive at the claimed invention. Therefore, the present invention is not obvious under 35 U.S.C. § 103 and accordingly, an obviousness rejection under this section is improper and the Applicants respectfully request reconsideration and withdrawal of this rejection.

The Examiner has rejected claims 21-22, 24-26, 28, and 31-33 under 35 USC §103(a) as being unpatentable over Beck U.S. 5,634,986 (Beck) in view of Japanese Patent JP 03-188168A (JP '168) in further view of Musingo *et al.*, U.S. 5, 954,892 (Musingo). Musingo merely teaches a zinc phosphating method and composition as known in the art. The Examiner contends that the coating formed from the Musingo process improves corrosion resistance and promotes adhesion and that one of ordinary skill in the art would have been motivated to provide the coatings of Beck with these desirable properties. Furthermore, the Examiner contends that it would have been obvious to heat the coated metal to an appropriate temperature that would provide a dry surface. This rejection is also respectfully traversed.

The critical deficiencies of the Beck and JP '168 references with regard to the specific elements required in the claims of the present application, have been discussed above. As will

be shown, none of the secondary references cited by the Examiner, *e.g.*, Musingo, in any way supplements the teachings of Beck and JP '168 references so as to provide those missing critical elements.

Musingo (US 5,954,892) teaches only that a zinc phosphate coating may be formed on a metal surface to improve the ability of the metal to retain a lubricant on its surfaces in order to improve corrosion resistance and paint adhesion. The Musango reference teaches an immersion coating and is not a roll coating (see column 4, line 53). This reference does not suggest the use of roll coating an antibacterial polymer onto the surface of a sheet metal and when combined with the Beck and JP '168 references, it does not teach the present invention. Therefore, major deficiencies of Musango *et al.* are not in any way remedied by Beck and JP '168 and it is therefore respectfully requested that the rejection under 35 U.S.C. § 103(a) be withdrawn.

To summarize the art cited by the Examiner, all that is disclosed in Beck is that one may use antimicrobial agents to keep microbes from growing in a wash or rinse bath. Furthermore, all that is disclosed in Musingo is that a zinc phosphate coating may be formed on a metal surface to improve the ability of the metal to retain a lubricant on its surfaces in order to improve corrosion resistance and paint adhesion. Finally, all that is disclosed in JP '168 is that an aluminum can may be coated with a resin composition that includes an antibacterial zeolite to provide antibacterial properties.

One skilled in the art would find nothing in Beck, JP '168 or Musingo, either alone or in combination that would teach or suggest the present invention or a motivation for making the present invention. Furthermore, there is no motivation to combine the references in such a way as to arrive at the claimed invention.

Therefore, the present invention is not obvious under 35 U.S.C. § 103 and accordingly, an obviousness rejection under this section is improper and the Applicants respectfully request reconsideration and withdrawal of this rejection.

In view of the above, it is respectfully submitted that the claims as amended and presented before the Examiner are in condition for allowance. Accordingly, reconsideration and withdrawal of the rejections are requested and allowance of claims 1-71 is earnestly solicited.

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Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION.

Please amend the specification as indicated:

Replace paragraph 0052 with the following:

[0052] In particular in the compositions for pretreatment of galvanized metals or steel metal surfaces, preferably the composition also includes boric acid. When the prevalent metal surface for coating is galvanized, boric acid is generally present in an amount of at least 0.02 moles/liter, preferably in an amount of at least 0.05 moles/liter, and more preferably in an amount of at least 0.1 moles/liter.

IN THE CLAIMS.

Please amend the following claims as indicated:

(Once Amended) 1. A process of manufacturing a metal sheet precoated with an antimicrobial polymer coating, comprising:

providing a metal sheet substrate having two opposed planar surfaces comprising a base metal selected from the group consisting of aluminum, iron, nickel, titanium, molybdenum, magnesium, manganese, copper, silver, lead, tin, chromium, beryllium, tungsten, cobalt and alloys thereof;

cleaning the surface of the substrate wherein cleaning comprises removing bulk and molecular organic contaminants;

pretreating at least one planar surface of the substrate to promote adhesion of a polymer coating;

applying a polymer coating onto at least one planar surface of the substrate by roll coating the substrate with a polymer containing an anti-microbial powder comprising core particles associated with an antimicrobial metal component;

wherein the content of the antibiotic powder is in the range of from about 0.2 to about 30 weight percent of the polymeric coating;

wherein the core particle comprises one or more particles selected from the group consisting of: oxides selected from the group consisting of titanium, aluminum, zinc and copper oxides, sulfates selected from the group consisting of calcium, strontium and barium sulfates, sulfides selected from the group consisting of zinc and copper sulfides [is an oxide selected from the group consisting of titanium, aluminum, zinc and copper, sulfates of calcium, strontium and barium, zinc sulfide, copper sulfide], zeolites, zirconium phosphate, mica, talc, kaolin, mullite, silica and mixtures thereof;

wherein the antimicrobial metal component is selected from the group consisting of silver, copper, zinc, mercury, tin, lead, bismuth, cadmium, chromium, cobalt, nickel, and thallium ions and mixtures thereof; and

treating the coated substrate to produce at least a partially hardened and adhered antimicrobial coating on the final sheet product.

4. (Once Amended) The process of claim 3 wherein the base metal is [a nickel alloy] selected from the group consisting of steel alloys, zinc coated steel, aluminum coated steel, zinc aluminum coated steel, zinc alloys, aluminum alloys and nickel alloys [steel, zinc, zinc based alloys, zinc coated steel, zinc aluminum alloy coated steel, aluminum and aluminum alloy].

6. (Once Amended) The process of claim 3 wherein the base metal is selected from the group consisting essentially of copper alloys, brass, bronze, silicon bronze, silicon brass, nickel silver and nickel bronze. [a copper alloy such as brass, bronze, silicon bronze, silicon brass, nickel silver and nickel bronze]

29. (Once Amended) The process of claim 21 wherein the metal substrate is predominantly galvanized steel or steel and wherein the phosphating composition includes boric acid in an amount of at least 0.02 moles/liter.

34. (Once Amended) The process of claim 13 wherein the polymer is an organic polymer material selected from the group consisting of acetate rayon, acrylic resins, acrylonitrile-butadiene-styrene resins and acrylic resins, aliphatic and aromatic polyamides, aliphatic and aromatic polyesters, allyl resins, butadiene

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resins, chlorinated polyethylene, conductive resins, copolymerised polyamides, copolymers of ethylene and vinyl acetate, cuprammonium rayons and natural and synthetic rubbers, EEA resins, epoxy resins, ether ketone resins, ethylene vinyl alcohol, fluorine resins, fluorocarbon polymers, fluoroplastics, high density polyethyelenes, ionomer resins, liquid crystal polymer, low density polyethylenes, melamine formaldehyde, natural polymers [such as cellulosics], nylons, phenol-formaldehyde plastic, phenolic resins, polyacetal, polyacrylates, polyacrylonitrile, polyamide, polyamide-imide, polyaryletherketone, polybutadiene, polybutylene terephthalate, polybutylene, polycarbonate, polycarbonates, polydicyclopentadiene, polyketones, polyester block copolymers, polyesters, polyesterurethane, polyesterurethaneurea, polyether and polyester block polymers, polyether ketoneketone polyetherether ketone polyetherimide, polyethers, polyethersulfone, polyetherurethane, polyetherurethaneurea, polyethylene isophthalate, polyethylene terephthalate, polyethylene, polyethylenechlorinates, polyglycolic acid, polyhexamethylene terephthalate, polyimide, polylactic acid, polymethylpentene, poly-m-phenylene isophthalamide, polyolefins, polyphenylene oxide, polyphenylene sulfide, polyphthalamide, poly-p-phenylene terephthalamide, polypropylene, polysiloxanes, polystyrene, polysulfides, polysulfone, polytetrafluoroethylene, polyurethane, polyvinyl acetate, polyvinyl alcohols, polyvinylchloride, polyvinylidene chloride, polyvinylidene fluoride and polyvinyl fluoride, rayon, reconstituted silk and polysaccharides, reinforced polyethylene terephthalate resins, segmented polyurethane elastomers, silicone resins, elastane elastomers, styrene-type specific resins, thermoplastic polyurethane elastomers, phenol-formaldehyde copolymer, triacetate rayon, unsaturated polyester resins, urea resins, urethane resins, vinyl chloride resins, vinyl polymers, vinylidene chloride resins and copolymers, terpolymers and mixtures thereof.

53. (Once Amended) The process of claim 44 wherein the [anti-microbial powder has a second coating of a composition] <u>zeolite is ion-exchanged with one or more additional metal ions</u> selected from the group consisting of silica, silicates, silicon dioxide, borosilicates, aluminosilicates, alumina, aluminum

phosphate, zinc, zinc oxide, zinc silicate, copper, copper oxide, and mixtures thereof.

54. (Once Amended) The process of claim 53 wherein the [second coating] additional metal ions comprise [comprises] from about 0.1 to about 20% by weight, based on anhydrous zeolite plus metal.

61. (Once Amended) The process of claim 44 wherein the roll coater is a two-roll coater.